

## Short biography and C.V. for Steen Rasmussen

Dr. Steen Rasmussen (Ph.D. Technical University of Denmark, 1985) has pioneered several approaches, methods, and applications for self-organizing processes in natural and artificial systems including: abstract self-programmable matter, molecular dynamics (MD) lattice gas simulations for molecular self-assembly, rational and evolutionary protocell design, disaster mitigation and decision support systems based on collective intelligence, as well as novel simulations for large-scale socio-technical systems. He is currently the (acting) Team Leader for the Self-Organizing Systems team at Los Alamos. He also leads the Los Alamos Astrobiology program at Los Alamos working on experimental and computational protocells, with the USAF as a co-sponsor. Further, he is one of the principal investigators on the new European Union sponsored Programmable Artificial Cell Evolution (PACE) program (8.5 M euro over the next 4 years), and he was one of the founders of the Artificial Life movement. He was the Chair of the Science and Engineering Leadership Team (SELT) for 2001-2002 in the Earth and Environmental Science (EES) Division at LANL. He co-developed the Transportation Simulation System (TRANSIMS), which is now being used by the USA Department of Transportation, he co-directed the Urban Security Initiative at LANL, which developed an integrated simulation framework for urban systems. He is currently part of the Los Alamos team on Critical Infrastructure Protection, sponsored by the Department of Homeland Security. He has published more than 70 peer reviewed papers and many internal technical reports, given more than 135 invited talks, posters and demos outside of home institutions, and he has co-organized five international and several national conferences. He recently (September 2003) organized the first two international protocell meetings one at Los Alamos and Santa Fe Institute and one at ECAL in Dortmund, Germany. Many communications about his work inside and outside of the scientific establishment have appeared on television and in newspapers, periodicals, and books. Since the summer of 2000 he has sponsored five postdocs (three theorists, one experimentalist, and one in collective intelligence) and 11 graduate and undergraduate students.

**EDUCATION:** Ph.D., Technical University of Denmark (TUD), Physics. (1985)  
M.Sc., Technical University of Denmark (TUD), Physics. (1982)  
Studied Philosophy at University of Copenhagen (1978-1981)

### EMPLOYMENT AND EXPERIENCE:

10/02 – present, Team Leader (acting), Self-Organizing Systems, EES, Los Alamos National Laboratory  
02/97 – 09/02, Staff Scientist, Earth and Environmental Science, Los Alamos National Laboratory.  
11/92 – 02/97, Staff Scientist, Simulation Applications, Los Alamos National Laboratory.  
10/91 – 10/92, Staff Scientist, Theoretical Division, Los Alamos National Laboratory.  
09/88 – present Part time researcher in residence, Santa Fe Institute.  
09/88 – 09/91, Postdoc, Center for Nonlinear Studies (CNLS), Los Alamos National Laboratory.  
11/85 – 09/88, Postdoc, Physics Laboratory, Technical University of Denmark.

### SELECTED HONOURS AND AWARDS:

1988 Received the award “P. Gorm-Petersens Mindelegat” (Results on Instabilities and Self-Organizing Processes) in the presence of Her Majesty the Queen, Magrethe II of Denmark.  
1991-1996 Associate Editor, *Nanobiology*  
1993-present Member, Editorial Board, *Artificial Life*  
2000 Cerro Grande Wildfire Award, for implementing collective intelligence methods (People Finder Databases) for efficient disaster mitigation.  
2004 Los Alamos Achievement Award for Excellence (Developing Protocell Design).

**SELECTED PAPERS (NEXT PAGE) OR** <http://www.ees.lanl.gov/EES5/staff/steen/papers>

## SELECTED PAPERS

- S. Rasmussen, L. Chen, D. Deamer, D. Krakauer, N. Packard, P. Stadler, & M. Bedau, Transitions from nonliving to living matter, *Science* **303** (2004) to appear Feb. 13.
- S. Rasmussen, L. Chen, B. Stadler, and P. Stadler, Proto-organism kinetics, *Origins Life & Evol. Biosph.*, **34** (2004) 171
- S. Colgate, S. Rasmussen, J. Solem, and K. Lackner, An astrophysical basis for a universal origin of life, *Adv. Complex Sys.*, **6** (2003) 1
- S. Rasmussen, L. Chen, M. Nilsson, and S. Abe, Bridging nonliving and living matter, *Artificial Life*, **9** (2003) 269.
- S. Rasmussen, M. Raven, G. Keating, and M. Bedau, Collective intelligence of the artificial life community on its own successes, failures, and future, *Artificial Life*, **9** (2003) 207.
- D. Yamins, S. Rasmussen, and D. Fogel, Growing urban roads, *Networks and Spatial Economics*, **3** (2003) 69.
- C. Andersson, K. Lindgren, S. Rasmussen, and R. White, Urban growth from “first principles”, *Phys Rev E*, **66** (2002) 026204.
- C. Andersson, S. Rasmussen, and R. White, Urban settlement transitions, *Env. & Planning B* **29** (2002) 841.
- S. Rasmussen, N. Baas, M. Olesen, B. Meyer, and M. Nilsson, Ansatz for dynamical hierarchies, *Artificial Life*, **7** (2001) 329.
- M. Nilsson, S. Rasmussen, B. Mayer, and D. Whitten, Molecular Dynamics (MD) Lattice Gas: 3-D molecular self-assembly, in: *New Constructions in Cellular Automata*, Eds D. Griffeth and C. Moore, Oxford University Press (2003) 183.
- M. Bedau, J. McCaskill, N. Packard, S. Rasmussen, C. Adami, D. Green, T. Ikegami, K. Kaneko, and T. Ray, Open problems in artificial life, *Artificial Life* **6** (2000) 363.
- B. Mayer and S. Rasmussen, Dynamics and simulation of self-reproducing micelles, *Int. J. of Modern Phys. C* **11** (2000) 809.
- G. Heiken, G.A. Valentine, M. Brown, S. Rasmussen, D. George, R. Greene, E. Jones, K. Olsen, C. Andersson, Modeling Cities—The Los Alamos Urban Security Initiative, *Journal of Public Works Management and Policy* **4** (2000) 198.
- B. Mayer, G. Koehler, and S. Rasmussen, Simulation and Dynamics of Entropy Driven, Molecular Self-Assembly Processes, *Physical Review E* **55** (1997) 1
- T.T. Puck, R. Johnson, and S. Rasmussen, A system for mutation measurement in mammalian cells: Application to gamma-irradiation, *Proc. Natl. Acad. Sci. USA* **94** (1997) 1218
- K. Nagel and S. Rasmussen, Traffic at the edge of chaos, *Artificial Life IV*, Ed. R.A. Brooks and P. Maes, MIT Press (1994) 222.
- R. Feldberg, C. Knudsen, S. Rasmussen, Recursive definition of global cellular automata mappings, *Phys. Rev. E* **49** (1994) 1699
- H. Hotani, R. Lahoz-Beltra, B. Combs, S. Hameroff, S. Rasmussen, Liposomes, Microtubules, and Artificial Cells; *Nanobiology* **1** (1992) 61
- S. Rasmussen, C. Knudsen, R. Feldberg, and M. Hindsholm, The Coreworld: Emergence and Evolution of Cooperative Structures in a Computational Chemistry, *Physica D* **42** (1990) 11
- S. Rasmussen, H. Karampurwala, R. Vaidyanath, K. Jensen, and S. Hameroff, Computational Connectionism within Neurons: A Model of Cytoskeletal Automata Subserving Neural Networks, *Physica D* **42** (1990) 428
- B. Bollobas and S. Rasmussen, First Cycles in Random Directed Graph Processes, *Discrete Math.*, **75** (1989) 55
- S. Rasmussen, Toward a Quantitative Theory of the Origin of Life, In: *Artificial Life*, Ed. C. Langton, Addison-Wesley, (1989) 79

## CONTACT

Permanent resident of USA (alien of extraordinary ability)  
131 County Road 84, Santa Fe NM 87506, USA  
Email: steen@protolife.net  
Tel: +1-505-455-3437  
Born July 7, 1955, in Helsingør, Denmark (Citizen of Denmark).  
Married to Jenny Cocq, three children, Kristina, Leif and Felicia

SOS Team Lead, EES-6, MS-T003 (& CNLS)  
Los Alamos National Laboratory  
Los Alamos NM 87545 U.S.A.  
Tel: +1-505-665-0052, Fax: +1-505-665-8737  
Email: steen@lanl.gov  
Web: <http://www.ees.lanl.gov/EES5/staff/steen>